

Are you getting the most from measuring steam flow?

Are you really measuring the steam energy being delivered to your process plant? or, if you are monitoring boiler efficiency, do you really know how efficient your boiler plant is?

The chances are that if you are using a variable orifice device the answer is no and that almost certainly applies to fixed orifice as well. Fixed orifice plates have done sterling work over many years but they are prone to losing accuracy in steam pipelines due to wear and they do have a very poor turndown. Variable orifice devices on the other hand were sold to extend the turndown while retaining accuracy of measurement, which is a complete misnomer.

Fixed orifice plates are prone to losing accuracy in steam pipelines

Variable orifice plates are mechanical devices with all that implies for stable accuracy. They are advertised as giving 100:1 turndown but this is not fully explained or more probably understood. Turndown is referenced from the maximum permitted flow through the device, which is very seldom attained. At flow rates below 5% of maximum flow, accuracy is determined as a percentage of the maximum flow rate, which seriously compromises overall accuracy. The very best turndown this equipment

Vortex and averaging pitot flowmeters are energy efficient and contribute to payback

can achieve and retain accuracy is 20:1 turndown but this is from maximum allowable flow rate through the device, which it's doubtful that any application can achieve.

These units are often paired with an associated transmitter or computer in order to ensure accuracy and cannot be interchanged without recalibration. The accuracy also takes no account of installation issues and impulse line effects, which also compromise the final system accuracy. Added to this mechanical wear and ambient temperature conditions, any accuracy of flow measurement whether immediately or over a period of time is extremely tenuous.

Industrial process plants use orifice plates mainly where the flow velocity is steady state or only minor deviations. These devices have given many years of service but variable orifice devices in these industries are an oddity and are very rarely seen due to accuracy considerations. In the process plant other devices are now the norm, and the industry has moved on. Even in the case of orifice plates, impulse lines have been dropped in favour of direct-coupled pressure transmitters thus eradicating the accuracy losses imposed by the impulse line installations.

The main considerations when specifying a meter should of course be accuracy of measurement followed by repeatability but these days energy saving should be high on the



Newly installed Rosemount 3095MFA averaging pitot tube steam flow meter being commissioned

Energy saving should be an important consideration when measuring steam

list, particularly when measuring steam and by moving to the newer technologies of vortex meters and averaging pitot tubes pressure drops are significantly reduced giving an energy saving which significantly contributes to the overall cost saving of the change. The added benefit is a system that has a guaranteed long-term accuracy, does not wear and the



Rosemount 3095MFA steam meter providing stable and accurate flow readings, even at low flow velocities

advantage that modern technology brings in system diagnostics information technology.

Today's steam flow meters have integral temperature sensors that give a direct readout of compensated mass flow for saturated steam applications.

Even if Orifice plates are considered to be the best for the job the latest direct-coupled transmitters with temperature compensation ensure mass flow is measured with no inaccuracy due to impulse line issues.

Two major problems found at some sites using steam are steam pipes that were sized for much larger flow volumes now having reduced levels of flow hence flow velocities are low making flow measurement difficult. Also pipe configurations that have no straight, runs a prerequisite of accurate flow measurement for most primary devices. The former problems can be solved using reducing vortex meters that reduce the pipe diameter at the measuring point only, with no loss of accuracy and only a minimal reduction in line pressure drop. This negates the need to alter long lengths of pipework to give accurate measurements. The later problem if it cannot be resolved due to space

Installation by the people who manufacturer the device ensures you derive maximum benefit from your investment

considerations can be overcome by using a conditioning orifice plate with close-coupled transmitter. This allows accurate flow measurement in places that were impossible before.

Installation by the people who manufacturer the devices ensures you derive the maximum benefit from your investment and that all of the functions on the transmitter are available to you and that the equipment is installed in a correct manner.

If you would like to know more about what we can offer, discuss steam flow in general, assess the performance of existing equipment, or even make recommendations for your plant, give us a call, we would be only to happy to pay site visit to discuss the options available with no obligation.

We look forward to hearing from you.